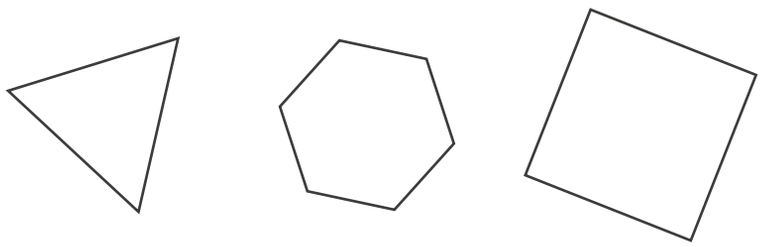
vi+aminlondon

Vitamin Puzzle
Developer Test

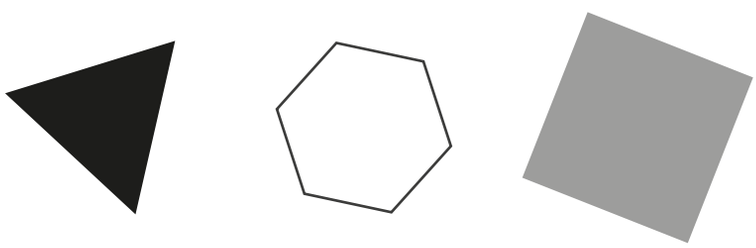
V

Hello there, welcome to the Vitamin Puzzle. Let's start with some basic information.

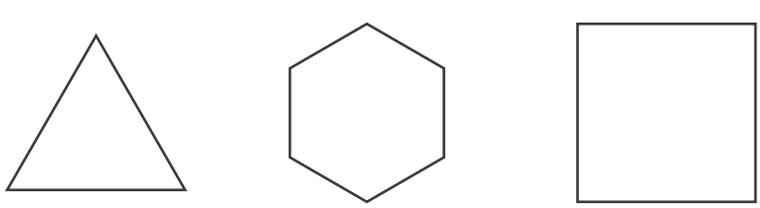
These shapes are called "**Vitamins".**



A vitamin is therefore a convex regular polygon.
These vitamins have **colours:** white, grey or black.



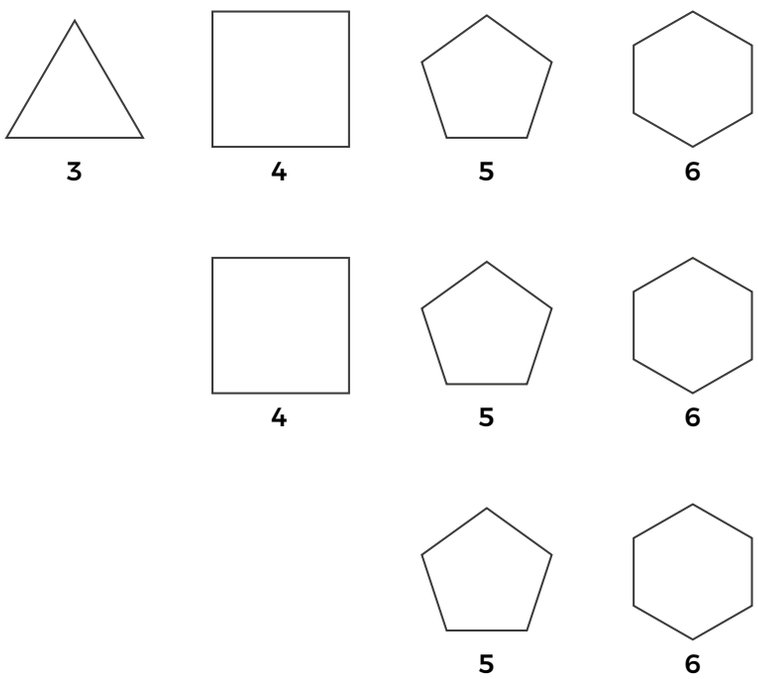
There exists a comparison operator that evaluates vitamin value based on its number of **edges/vertices**.



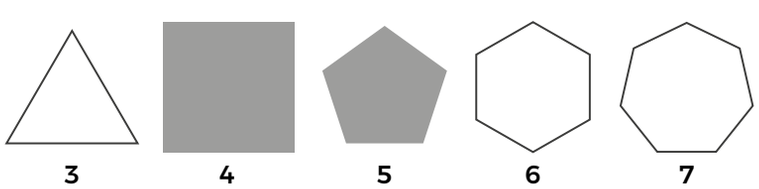
We can therefore say that: 4 < 6 , 5 > 3

Now we've covered Vitamins, we can move on to Vitamin Lines.

A **vitamin line** is a sequence of vitamins arranged in a strictly ascending order, valued from 3 onwards, with no gaps.



A vitamin line can be divided into **colour groups** - at least one as all vitamins can be the same colour.



White group: 3, 5, 6, 7
Grey group: 4,
Black group <empty>

We can also go one step further than colours, there are Operations, mini and maxi Vitamins.

In each non-empty colour group there can be one **mini-vitamin** and one **maxi-vitamin**. A mini-vitamin is the smallest in its colour group. A maxi-vitamin is the greatest in its colour group.

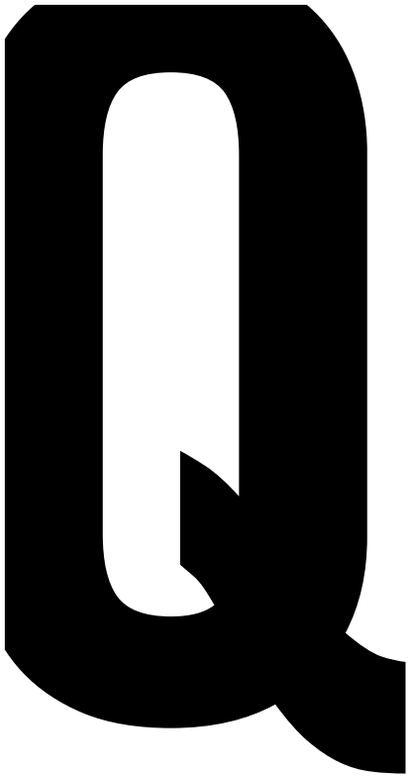
Based on the previous example, we have:
White mini-vitamin: 3
White maxi-vitamin: 7
Grey mini-vitamin: 4
Grey maxi-vitamin: 4
Black mini-vitamin: none
Black maxi-vitamin: none.

There is one atomic operation that can be performed in a vitamin line: **colour swap.**

The operation is performed on one vitamin and it means it will change its colour (effectively going from one colour group to another).

The colour swap operation has two hard constraints:
A. Only maxi-vitamins can perform the colour swap
B. The changing vitamin must remain a maxi-vitamin after the colour swap.

They are known as the **maxi-maxi principle**.



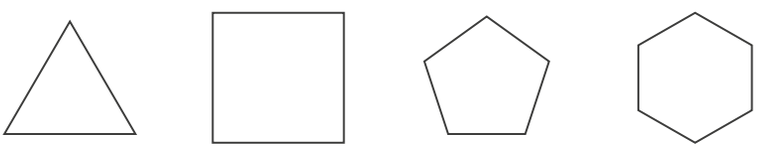
Got all that? Great.
Time for some tasks.

1A

Given the starting situation of:

3 4 5 6

Please write a list of colour swaps to get to the goal situation:



3 4 5 6

1B

Write a function called makeAllWhite (in a programming language of your choice) that will take a string representing the initial situation as its argument and return the list of colour swaps (as a json string) that will allow for all vitamins to become white. Input and output formats as below.

Input: “3G 4G” //means there are two grey vitamins

Output:

```
[
[4, "G", "B"],      //square vitamin goes from grey to black
[3, "G", "W"],      //triangular vitamin goes from grey to white, etc.
[4, "B", "W"]
]
```

Is your solution optimal?

2

On to section two.
Awesome stuff.

2A

Write a piece of code that will prepare a visualisation of a vitamin line.

Input: "3B 4B 5G 6W"

2B

Modify the code from TASK 2A so that if the input is provided again the visualisation will smoothly transist to the new state.

New input: "3G 4W 5G 6B"

3

The finishing line is in sight.
Still, more lines of code to write.

3A

Write a function that will take two arguments as input:
A. Initial state: "3G 4G"

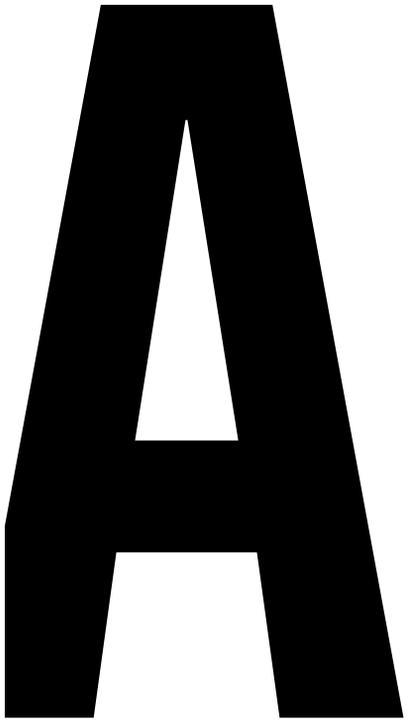
B. List of operations:
[
[4, "G", "B"],
[3, "G", "W"],
[4, "B", "W"]
]

And will produce a json-encoded array of consecutive states given the two:

(Output)
[
    "3G 4G",
    "3G 4B",
    "3W 4B",
    "3W 4W"
]

3B

Use the solutions for TASK 3A and TASK 2B to prepare animation consisting of multiple colour swap transitions.



Finished, optimised and accurate?
We’re keen to see what you’ve created.

text about where to send to.